

Application No. 09/549,718
Reply to Office Action of May 29, 2003

*Please
enter
WAL*

Amendments to and Listing of the Claims:

1. (Previously Presented) A hydrogen refinement apparatus comprising a source of reformed gas containing at least a hydrogen gas, carbon monoxide and water vapor, and a reaction chamber equipped with a carbon monoxide shifting catalyst body positioned downstream from said reformed gas source,

wherein said carbon monoxide shifting catalyst body comprises a carrier composed of at least one oxide of a metal selected from the group consisting of Ce, Zr and Ti, having a BET specific surface area of at least $10 \text{ m}^2/\text{g}$ and Pt supported thereon, such that carbon monoxide in said reformed gas is capable of being reduced by a shift reaction in said reaction chamber.
2. (Original) The hydrogen refinement apparatus in accordance with claim 1, wherein the BET specific surface area of said carrier is $250 \text{ m}^2/\text{g}$ or less.
3. (Canceled)
4. (Original) The hydrogen refinement apparatus in accordance with claim 1, wherein said metal oxide contains Ce.
5. (Original) The hydrogen refinement apparatus in accordance with claim 4, wherein said metal oxide contains Zr.
6. (Previously Presented) A hydrogen refinement apparatus in accordance with claim 1, wherein said carbon monoxide shifting catalyst body comprises a carrier supporting Pd, Rh or Ru in an amount of 0.1 to 0.5 fold by weight based on Pt, in addition to Pt.
7. (Currently Amended) A method for operating a hydrogen refinement apparatus comprising a source of reformed gas containing at least a hydrogen gas, carbon monoxide, and water vapor and a reaction chamber equipped with a carbon monoxide shifting catalyst body positioned downstream from said reformed gas source; said carbon monoxide

Application No. 09/549,18
Reply to Office Action of May 29, 2003

shifting catalyst body comprising a carrier composed of at least one ~~metal~~ oxide of a metal
selected from the group consisting of Ce, Zr and Ti, having a BET specific surface area of at
least 10 m²/g and Pt supported thereon,

comprising the steps of controlling the temperature of said carbon monoxide
shifting catalyst body from 150 to 450 °C and reducing carbon monoxide in said reformed gas by
a shift reaction in said reaction chamber.

8. (Previously Presented) The method for operating a hydrogen refinement
apparatus in accordance with claim 7, further comprising the step of controlling the temperature
of the upstream side part of said carbon monoxide shifting catalyst body to more than the
temperature of the downstream side part thereof.

9. (Previously Presented) The method for operating a hydrogen refinement
apparatus in accordance with claim 7, wherein said reformed gas containing 24 to 50% by
volume of water vapor is fed.

10. (Previously Presented) The hydrogen refinement apparatus of claim 1,
wherein the carrier is in a form of pellets.

11. (Previously Presented) The hydrogen refinement apparatus of claim 10,
wherein the pellets are located inside a column.

12. (Previously Presented) The hydrogen refinement apparatus of claim 1,
wherein a surface of the carrier is composed of a slurry coating of a heat-resistant metal material.

13. (Previously Presented) The hydrogen refinement apparatus of claim 12,
wherein the metal material is selected from the group consisting of cordierite and mullite.

14. (Previously Presented) The hydrogen refinement apparatus of claim 1,
wherein the carrier is in a form of a honeycomb.

01/28/2004 13:52 FAX

AKIN GUMP STRAUSS HAUER

2009

Application No. 09/549,18
Reply to Office Action of May 29, 2003

15. (Previously Presented) The method of claim 7, further comprising the step of feeding water vapor such that an amount of water vapor contained in said reformed gas is from about 24% to about 50% by volume. - -